

Claims:

1. A branching unit for interconnecting at least three undersea optical transmission cables, said branching unit comprising:

first, second and third ports for receiving first, second and third undersea optical transmission cables, respectively, said first and second cables each including an electrical power conductor and a plurality of first optical fibers, said third cable being electrically unpowered and including at least one drop optical fiber and at least one add optical fiber;

an electrical power conductor segment for electrically coupling the conductor in the first cable received in the first port to the conductor in the second cable received in the second port;

a first optical fiber segment optically coupling a first of the plurality of first optical fibers in one of the first or second cables to the drop optical fiber of the third cable;

a second optical fiber segment optically coupling a second of the plurality of first optical fibers in one of the first and second cables to the add optical fiber of the third cable;

first and second optical amplifiers located along the first and second optical fiber segments, respectively so that the first optical amplifier provides optical gain to traffic being dropped on the drop optical fiber of the third cable and the second optical amplifier provides optical gain to traffic being added on the add optical fiber of the third cable; and

at least one electrically conductive path for supplying electrical energy from at least one of the electrical power conductors to each of the optical amplifiers.

2. The branching unit of claim 1 wherein the third cable includes a plurality of drop optical fibers and a plurality of add optical fibers and further comprising:

a third optical fiber segment optically coupling a first of the plurality of first optical fibers in the other of the first or second cables to one of the drop optical fibers of the third cable; and

a fourth optical fiber segment optically coupling a second of the plurality of first optical fibers in the other of the first and second cables to the one of the add optical fiber of the third cable.

3. The branching unit of claim 2 further comprising
third and fourth optical amplifiers located along the third and fourth optical fiber segments, respectively so that the third optical amplifier provides optical gain to traffic being dropped and the fourth optical amplifier provides optical gain to traffic being added; and
at least a second electrically conductive path for supplying electrical energy from at least one of the electrical power conductors to each of the optical amplifiers.

4. The branching unit of claim 1 wherein said first and second cables each include a third optical fiber and further comprising another optical fiber segment optically coupling the third optical fiber of the first cable to the second optical fiber of the second cable.

5. The branching unit of claim 4 further comprising another optical amplifier located along said another optical fiber segment for providing optical gain to through traffic traversing said another optical fiber segment.

6. A branching unit for interconnecting at least three undersea optical transmission cables, said branching unit comprising:

first, second and third ports for receiving first, second and third undersea optical transmission cables, respectively, said first and second cables each including an electrical power conductor and a plurality of first optical fibers, said third cable being electrically unpowered and including at least one drop optical fiber and at least one add optical fiber;

an electrical power conductor segment for electrically coupling the conductor in the first cable received in the first port to the conductor in the second cable received in the second port;

a first optical fiber segment optically coupling a first of the plurality of first optical fibers in the first cable to a first of the plurality of first optical fibers in the second cable;

a second optical fiber segment optically coupling a second of the plurality of first optical fibers in the first cable to a second of the plurality of first optical fibers in the second cable;

a first add/drop element located along the first optical fiber segment for dropping traffic at one or more selected wavelengths to the drop optical fiber of the third cable;

a second add/drop element located along the second optical fiber segment for adding traffic at one or more selected wavelengths to the add optical fiber of the third cable;

a first optical amplifier receiving the traffic from the first add/drop element and providing optical gain thereto;

a second optical amplifier receiving the traffic from the add optical fiber of the third cable and providing optical gain thereto

at least one electrically conductive path for supplying electrical energy from at least one of the electrical power conductors to each of the optical amplifiers.

7. The branching unit of claim 6 wherein the third cable includes a plurality of drop optical fibers and a plurality of add optical fibers and further comprising:

a third add/drop element located along the first optical fiber segment for adding traffic at one or more selected wavelengths from one of the plurality of add optical fibers to the first optical fiber segment;

a fourth add/drop element located along the second optical fiber segment for dropping traffic at one or more selected wavelengths to one of the drop optical fibers of the third cable;

8. The branching unit of claim 7 further comprising

a third optical amplifier receiving the traffic from one of the plurality of add optical fibers and providing gain to the traffic directed to the third add/drop element;

a fourth optical amplifier receiving the traffic from the fourth add/drop element and providing gain to the traffic directed to one of the drop optical fibers of the third cable.

9. The branching unit of claim 6 wherein said first and second cables each include a third optical fiber and further comprising another optical fiber segment optically coupling the third optical fiber of the first cable to the second optical fiber of the second cable.

10. The branching unit of claim 9 further comprising another optical amplifier located along said another optical fiber segment for providing optical gain to through traffic traversing said another optical fiber segment.

11. In an undersea optical transmission system that includes a plurality of land-based trunk terminals in optical communication with one another over at least first and second optical transmission trunk cables and a remotely located land-based branch terminal in optical communication with at least one of the trunk terminals over an optical transmission branch cable, a branching unit interconnecting the first and second trunk cables with the branch cable, said branching unit comprising:

first, second and third ports for receiving first and second trunk cables and the branch cable, respectively, said first and second trunk cables each including an electrical power conductor and a plurality of first optical fibers, said branch cable being electrically unpowered and including at least one drop optical fiber and at least one add optical fiber;

an electrical power conductor segment for electrically coupling the conductor in the first cable received in the first port to the conductor in the second cable received in the second port;

a first optical fiber segment optically coupling a first of the plurality of first optical fibers in one of the first or second cables to the drop optical fiber of the branch cable;

a second optical fiber segment optically coupling a second of the plurality of first optical fibers in one of the first and second cables to the add optical fiber of the branch cable;

first and second optical amplifiers located along the first and second optical fiber segments, respectively so that the first optical amplifier provides optical gain to traffic being dropped on the drop optical fiber of the branch cable and the second optical amplifier provides optical gain to traffic being added on the add optical fiber of the branch cable; and

at least one electrically conductive path for supplying electrical energy from at least one of the electrical power conductors to each of the optical amplifiers.